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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/980,384	05/02/2002	Michael Frisch	KSN0021	1054

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Eric J Groen
Baker & Daniels
205 West Jefferson Blvd Suite 250
South Bend, IN 46601

EXAMINER

LEVI, DAMEON E

ART UNIT

PAPER NUMBER

2841

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/980,384

Applicant(s)

FRISCH, MICHAEL

Examiner

Dameon E Levi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE Paper No. 16, 06/30/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima US Patent 5747875 in view of Kaindl EP 0751570

Regarding claim 1, Oshima discloses a device comprising:

- a power part of the electronic components of which are arranged on a power substrate,(for example, see elements 221,222,T1-T4, Figs 1, 7-11)
- a logic part of the components of which are arranged on a circuit board having a recess in which the power part is located and electrically connected to the logic part by means of wire bonding techniques (for example, see elements 231,IC1-IC4,W Figs 1, 7-11)
- the power substrate being mounted on a cooling plate, (for example, see element 270, Fig 9, 225, Fig 1)
- wherein a first portion of the circuit board is mounted on the cooling plate, the first portion surrounding the power substrate (for example, see element 270, Fig 9, 225, Fig 1 see Fig 6).

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Oshima does not disclose a second portion of a circuit board supporting at least one component forming a logic portion of a circuit board which is not mounted on a cooling plate.

Kaindl discloses an intelligent power module having first and second circuit board portions and wherein a second portion of a circuit board supporting at least one component forming a logic portion of a circuit board is not mounted on a cooling plate (for example, see elements 1, 3, 2, 4, Figs 1, 2).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the first and second portions, the second portion containing the logic parts not being mounted on the cooling plate as taught by Kaindl in the module assembly as taught by Oshima et al for the purpose of efficiently transferring heat from the power elements to the cooling plate, thereby allowing the power module to integrate power and control elements without overheating and to increase the efficiency of the module as a whole.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima US Patent 5747875 in view of Kaindl EP 0751570 and further in view of Nishihara et al US Patent 5266746.

Regarding claim 2, Oshima and Kaindl discloses the instant claimed invention except, wherein at least a strip portion along a side of the circuit board is left free and is not mounted on the cooling plate.

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Nishihara et al discloses an assembly wherein at least a strip portion along a side of circuit board is left free and is not mounted on a cooling plate (for example, see 11b, Figs 3A, 3B).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have left a strip portion along a side of the circuit board as taught by Nishihara et al in the device as taught by Oshima and Kaendl for the purpose of connecting the device to an external circuit (for example see Nishihara et al column 5, lines 44-46)

Regarding claim 3, Oshima and Linden et al discloses the instant claimed invention except wherein the cooling plate has contact pads on the side by means of which the module can be soldered directly in the slot-like opening of a system circuit board.

Nishihara et al discloses an assembly wherein a cooling plate has contact pads on the side (for example, see contact pads adjacent element 16b on portion 11b, Fig 3B)

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included contact pads on the side of the cooling plate as taught by Nishihara et al in the device as taught by Oshima and Linden et al for the purpose of connecting the device to an external circuit (for example see Nishihara et al column 5, lines 44-46)

Claims 4,5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima US Patent 5747875 in view of Kaendl EP 0751570 in view of Nishihara et al US Patent 5266746 and further in view of Kornrumpf US Patent 5345205.

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Regarding claim 4, Oshima , Kaendl and Nishihara et al disclose the instant claimed invention except that the multilayer circuit board consists of two parts connected by a thin intermediate section in which all lower layers of the multilayer circuit board are not present and only the component side uppermost layer is present as a bendable continuation in the form of a flexible, electrical and mechanical connecting layer between the two parts.

Kornrumph discloses an assembly in which a multilayer circuit board consists of two parts connected by a thin intermediate section in which all lower layers of the multilayer circuit board are not present and only the component side uppermost layer is present as a bendable continuation in the form of a flexible, electrical and mechanical connecting layer between the two parts (for example, see Figs 8,9)

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a flexible electrical and mechanical connecting layer as taught by Kornrumph in the device as taught by Oshima , Linden et al, and Nishihara et al for the purpose of folding the circuit and thereby, aid in the miniaturization of the assembly as a whole.

Regarding claim 5, Oshima and Nishihara et al disclose the instant claimed invention except that the flexible connecting layer is bent by 180° so that the two parts continue in bendable manner.

Kornrumph discloses an assembly wherein a flexible connecting layer is bent by 180° so that two parts continue in bendable manner (for example, see Figs 8,9)

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Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have bent the flexible connecting layer by 180 degrees as taught by Kornrumph in the device as taught by Oshima, Linden et al Nishihara et al for the purpose of folding the circuit and thereby, aid in the miniaturization of the assembly as a whole.

Regarding claim 6, Oshima and Nishihara et al disclose the instant claimed invention except that the first part of the multilayer circuit board, which has the recess, as well as the second, folded up part are approximately of equal size

Kornrumph discloses an assembly in which the first part of a multilayer circuit board, which has a recess, as well as the second, folded up part are approximately of equal size (for example, see Figs 8,9)

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to fold the two parts of the circuit board in approximately equal size as taught by Kornrumph in the device as taught by Oshima , Linden et al , and Nishihara et al for the purpose of aiding in the miniaturization of the assembly as a whole.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dameon E Levi whose telephone number is (703) 305-0426. The examiner can normally be reached on Mon.-Fri. (9:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David S Martin can be reached on (703) 308-3121. The fax phone numbers

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for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0058.

Dameon E Levi
Examiner
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DEL
July 3, 2003

A handwritten signature in black ink, appearing to read 'D. Martin', with a stylized, elongated final stroke.

DAVID MARTIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800